

Using Math Centers on Pythagoras

Pythagoras was born on the island of Samos in the Aegean Sea near the coast of what is now Turkey. He was born circa 580 B.C. He believed that one could understand the secrets of the universe by finding patterns in numbers, especially whole numbers. He was one of the first to give shape to what is now the science of mathematics. He discovered many fundamental patterns in our number system. These four centers will give students an idea about how he and his followers discovered patterns in both numbers and shapes.

Materials: An ample supply of any small manipulatives, such as pebbles, buttons, chips.

Directions:

1. Set up the four centers, putting out the materials, one center for every 4-5 students.
2. Describe the history of Pythagoras as above. If the students have had experience with the Pythagorean theorem, point it out as one of his accomplishments.
3. Explain that students will have the opportunity to discover some simple patterns in numbers as Pythagoras did, using only simple materials.
4. Allow 40 minutes for the students to go through each center and make a short entry in the math log. (Reproduce as many as needed below.) The centers should be scheduled so that the students do one center on each of four days.

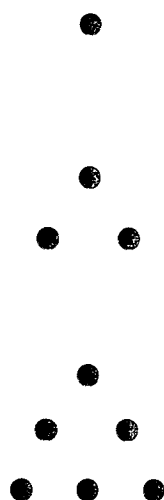
Math Center Log

Discovering Triangular Numbers

Materials: pencil, pebbles (or other small objects)

Directions:

Make the three shapes as shown below. Then continue building larger numbers until you reach a triangular number with 10 rows. Show your work by completing the table. Respond to the question and make an entry in your math journal.



Table

Number of rows	Number of pebbles
1	1
2	3
3	—
4	
5	
6	
7	
8	
9	
10	

What pattern do you see? _____

Challenge: Could you find how many pebbles you need to build a triangular number with 100 rows without having to actually build one that large?

Discovering Square Numbers

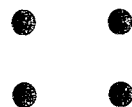
Materials: pencil, pebbles (or other small objects)

Directions:

Here is the first square number:



Here is the next square number:



You can probably begin to see the pattern. Continue building the square numbers and complete the table.

Number of pebbles on each side	1	2	3	4	5	6	7	8	9	10
Total number of pebbles	1	4								

Look at the number of total pebbles on your table. Find how the total number of pebbles grow as the square grows. What pattern do you see?

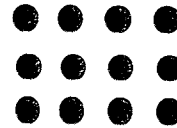
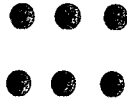
Discovering Oblong Numbers

Materials: pencil, pebbles (or other small objects)

Directions:

1. An oblong number is one shaped like a rectangle, whose one side is one longer than the other. Here is the first oblong number: ● ●

Here are the second and third:



Continue with the pattern until you get one that is 9 rows tall.

Number of rows	1	2	3	4	5	6	7	8	9
Total number of pebbles	2	6	12						

Describe the pattern you see. _____

2. Look at this pattern:

$$0 + 2,$$

$$2 + 4,$$

$$2 + 4 + 6,$$

$$2 + 4 + 6 + 8.$$

What is the pattern? _____

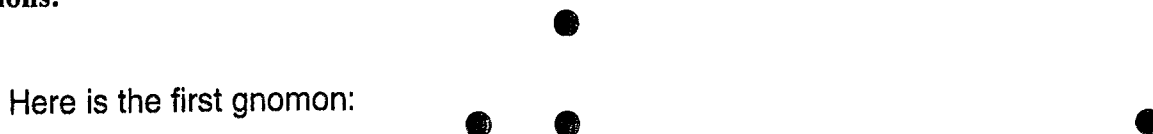
How does it describe how to make oblong numbers? _____

Discovering the Gnomon

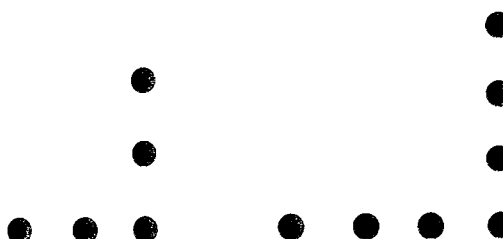
Materials: pencil, pebbles (or other small objects)

Directions:

Here is the first gnomon:



Here are the second and third gnomons:



Use the pebbles and continue the pattern until you get a gnomon that has ten pebbles along the bottom:

Number of pebbles along the bottom	1	2	3	4	5	6	7	8	9	10
Total number of pieces	3	5	7							

What pattern do you see? _____

Why must every gnomon have an odd total number of pebbles? _____

Can you see anything in the room that looks like a gnomon? What?
